**US EPA REGION 10**
**CLEAN AIR ACT SECTION 112(r)**
**INSPECTION REPORT**

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| **Stationary Source** | BP Cherry Point Refinery |
| **Date of Inspection** | June 10–14, 2013 |
| **USEPA Contact** | Javier Morales, Region 10 |
| **Description of Activities** | Inspection included the following activities:<br>• Opening conference with facility representatives<br>• Document review<br>• Field verification<br>• Personnel interviews<br>• Closing meeting with facility representatives |
| **Inspection Participants** | USEPA<br>• Javier Morales, Region 10<br>• Bob Hales, Region 10<br>• Craig Haas, OCE/WCED<br><br>ERG<br>• Dave Clark<br>• Dan Roper<br><br>E&E<br>• Jim Petersen<br><br>BP<br>• Scott McCreary<br>• Mark Moore<br>• Emily Cross |

## Stationary Source Information

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|---|---|
| **USEPA Facility ID #** | 1000 0004 8307 |
| **Most Recent Submission** | Date – 4/3/2013<br>Anniversary Date – 4/3/2018 |
| **Facility Location** | 4519 Grandview Road<br>Blaine, WA 98230 |
| **Lat / Long** | 48.892222, −122.732222 |
| **Number of Employees** | 820 |
| **Description of Surrounding Area** | The facility is located in a rural area. |

**Registration Information**

| Process ID | Process | Program Level | Chemical Name | Quantity (lb) | NAICS Code |
|---|---|---|---|---|---|
| 1000041224 | Unit #30–Utility Plant | 3 | Ammonia (conc 20% or greater) | 59,280 | 32411 Petroleum Refineries |
| 1000041225 | Unit #10–Crude/Vacuum | 3 | Flammable Mixture | 73,992 | |
| 1000041226 | Unit #11–#1 Reformer/Naphtha HDS | 3 | Flammable Mixture | 50,974 | |
| 1000041227 | Unit #12–Coker | 3 | Flammable Mixture | 33,448 | |
| 1000041228 | Unit #15–Hydrocracker | 3 | Flammable Mixture | 116,244 | |
| 1000041229 | Unit #16–Light Ends | 3 | Flammable Mixture | 699,480 | |
| 1000041230 | Unit #21–#2 Reformer | 3 | Flammable Mixture | 10,400 | |
| 1000041231 | Unit #22–LPG | 3 | Flammable Mixture | 21,528 | |
| 1000041232 | Unit #33–Tank Farm | 3 | Flammable Mixture | 232,105,927 | |
| | | | Pentane | 47,046,718 | |
| | | | Isobutane | 8,971,830 | |
| | | | Butane | 5,981,220 | |
| 1000041233 | Unit #45–Isomer | 3 | Flammable Mixture | 1,300,000 | |
| 1000041234 | Unit #26–ULSD (#2 DHDS) | 3 | Flammable Mixture | 23,684 | |
| 1000041235 | Unit #36/37–Gas Blender & LPG Loading | 3 | Propane | 4,800,000 | |
| | | | Butane | 1,262,500 | |
| | | | Isobutane | 1,262,500 | |
| 1000041236 | Unit #27–#3 DHDS | 3 | Flammable Mixture | 169,125 | |

## FACILITY/PROCESS DESCRIPTION

The BP Cherry Point Refinery (BP Cherry Point) is located south of Blaine, Washington. The Atlantic Richfield Company (ARCO) constructed the refinery and began operation in 1971. BP bought ARCO in 2000, including the Cherry Point refinery. BP Cherry Point processes crude petroleum into a variety of products including gasoline, diesel, jet fuel, liquefied petroleum gas (LPG), green and calcined coke, sulfur, and carbon dioxide. The refinery was originally designed to process 100,000 barrels per day (bpd) of Alaska North Slope (ANS) crude. BP Cherry Point has expanded since 1971, and can process up to 240,000 bpd of crude as of 1999. Due to the decline of ANS crude supplies, the refinery now uses a variety of crudes.

BP Cherry Point has 13 RMP covered processes, identified above, all of which are Program Level 3. This inspection focused on the following processes:

- Unit #10–Crude/Vacuum;
- Unit #11–#1 Reformer/Naphtha Hydrodesulfurization Unit (HDS);
- Unit #15–Hydrocracker; and
- Unit #27–#3 Diesel Hydrodesulfurization Unit (DHDS).

On February 17, 2012, a failure of a crude vacuum tower bottoms recirculation line resulted in a catastrophic fire. During the inspection, BP Cherry Point provided an overview of the incident as well as Incident Investigation Report No. 2012-IR-4062638 (BPCP-RMP-016248–016599).

## RMP DOCUMENTATION

The inspection team reviewed all applicable sections of RMP under 40 CFR Part 68 for Program Level 3 facilities. ERG specifically evaluated BP Cherry Point's operations for compliance with the following RMP elements:

- Process Safety Information (PSI) – 40 CFR 68.65;
- Operating Procedures – 40 CFR 68.69;
- Mechanical Integrity – 40 CFR 68.73;
- Management of Change (MOC) – 40 CFR 68.75; and
- Pre-startup Safety Review (PSSR) – 40 CFR 68.77.

Each reviewed RMP element is discussed below. Bulleted comments are provided to highlight key observations.

### Process Safety Information (PSI)

BP Cherry Point maintains PSI in several systems, mainly in "Documentum", which stores drawings and other design information (e.g., Form U-1). Ms. Emily Cross, the PSM administrative assistant, compiles the PSI for process hazard analyses (PHAs) (BPCP-RMP-017688–017696). The inspection team conducted field verifications in each of the four processes of interest and reviewed the PSI binder for the Unit #15–Hydrocracker 2013 PHA Revalidation. The inspection team also discussed BP Cherry Point's as-built review of the new Unit #27–#3DHDS P&IDs with the project manager and the document control manager.

- Based on field verification, there was a pressure gauge that was not shown on the relevant Vacuum Distillation Section Process P&ID (drawing no. AR-1000-23, rev. 121, BPCP-RMP-000513).
  - The pressure gauge was immediately downstream of control valve LV-10-100 at a location identified with a 2-inch blind flange on the P&ID (Frame 4, Section 11).
  - The pressure gauge reading was greater than the maximum indication of 300 pounds per square inch gauge (psig). Plant personnel stated this reading was inaccurate based on two other pressure indicators, PI 1080 and PI 1081, located upstream of control valve LV-10-100 and immediately downstream of the two vacuum bottoms pumps.
  - It was not clear whether an MOC was required or initiated for the installation of the pressure gauge. BP Cherry Point personnel could not identify a relevant MOC during the inspection.
  - Mr. Mark Moore stated there were photographs taken after the February 2012 fire that showed a blind flange at the pressure gauge location; therefore, the gauge was installed after the fire.

- The documents BP Cherry Point provided in response to a request for material and energy balances for the Unit #26–ULSD (#2 DHDS), Unit #27–#3 DHDS, and Unit #45–Isomer were all material balances and did not include energy balances (BPCP-RMP-018384–018403).
  - All three units requested were built after June 21, 1999, the date specified in 40 CFR 68.65(d)(1)(vii).
  - The documents provided mass and volumetric flow rates, densities, temperatures, pressures, and compositions, but did not include stream enthalpies or heat transfer equipment duties that would make these energy balances as well as material balances.

**Operating Procedures**

BP Cherry Point has written startup, shutdown, emergency and other process operating procedures. All procedures are stored and accessible electronically through a SharePoint™ system. Each unit control board also has hardcopy binders of the refinery common emergency procedures, unit emergency procedures, and safe operating limits/consequences of deviation. Experienced operators that serve as unit PSM specialists are typically the lead authors for procedures. Process superintendents certify procedures after review by unit foremen and operators. Operators review emergency procedures, routine procedures (i.e., those used more than once per year), and safe operating limits/consequences of deviation as part of annual refresher training. Operators review non-routine procedures, those used less than once per year, before use. Non-emergency startup and shutdown procedures, in particular, are reviewed by operators on all shifts before use. BP Cherry Point annually certified the Unit #10–Crude/Vacuum, Unit #11–#1 Reformer/Naphtha HDS, and Unit #15–Hydrocracker procedures for the last five years (BPCP-RMP-017942–017944). The Unit #27–#3 DHDS procedures were created and reviewed as part of the commissioning of the unit (BPCP-RMP-017945).

- The Unit #11–#1 Reformer and NHDS emergency shutdown procedures (respectively, BPCP-RMP-016600–016604 and BPCP-RMP-016709–016712), do not assign operators the authority and/or responsibility to initiate emergency shutdowns.
    - In contrast, the Unit #10–Crude-Vacuum and Unit #27–#3 DHDS emergency procedures state "Operators, foremen and shift supervisors may initiate this procedure when they feel it is advisable to do so," (respectively, BPCP-RMP-016699–016703 and BPCP-RMP-016634–016635).

**Mechanical Integrity**

The BP Cherry Point maintenance and reliability department manages and implements the mechanical integrity (MI) program at the facility for all stationary equipment, rotating equipment, instrumentation and electrical (I&E) equipment, emergency shutdown systems, and process safety valves (PSVs) and pressure relief valves (PRVs). BP Cherry Point conducts stationary equipment inspections according to American Petroleum Institute (API) 510, 570, and 653. PSV/PRV inspections are conducted in compliance with API 576. The BP Cherry Point staff includes five API-certified inspectors. This inspection staff is supported by two certified Level 2 non-destructive testing (NDT)-certified contracting firms.

BP Cherry Point uses PRIDE™, Maximo™ and SharePoint™ software systems as their Computerized Maintenance Management System (CMMS) to manage the scheduling of maintenance and inspections and archive inspection results. Maintenance department representatives provided inspection records and procedures for review. The inspection team requested and reviewed current inspection schedules for stationary equipment, PRVs/PSVs, rotating equipment, and I&E (critical and normal operation).

- In the 2011 Compliance Audit Report No. 1106, Finding No. 1106-003 stated that 38 of 62 process monitoring devices had failed to be tested. The assigned corrective action was to expand the definition of process control elements in an MI policy document to include process monitoring devices. Although BP Cherry Point expanded the MI policy document definitions, these process monitoring devices and emergency shutdown systems did not have the same level of procedural information as other devices deemed to be critical instrumentation.
    - As discussed in the finding, the document *Instrument Electric Shop, Process Safety Management – Mechanical Integrity*, Revision 2 dated November 14, 2009 (BPCP-RMP-016364–016371) did not discuss process monitoring devices. This MI policy document included hydrogen sulfide monitors, safety instrumented system (SIS) instruments, Legacy Logic System check procedure instruments, emergency alarm instruments, and instruments identified as part of a safety independent protection layer (IPL).
    - The most recent version of this document, Revision 6 dated July 30, 2012 (BPCP-RMP-017887–017893) included a section "CRITICAL INSTRUMENTATION DEFINED" (BPCP-RMP-017888) with the following addition:

"Safety critical instrumentation is listed below and includes the following items in WAC 296-067-037 (1):

(d) Emergency shutdown systems;

(e) Controls (including monitoring devices and sensors, alarms, and interlocks)"

— The policy section titled "MAINTENANCE PLANS AND PROCEDURES" includes more detailed maintenance procedures, recordkeeping specifics, PHA requirements and/or other constraints related to maintenance activities for all defined critical instrumentation elements except those added in response to the audit report finding (items (d) and (e) above).

**Management of Change (MOC) & Pre-Startup Safety Review (PSSR)**

The BP Cherry Point MOC program is administered within the guidelines established in Process Safety Management (PSM) Document #1100, *Management of Change Policy* (BPCP-RMP-018374-018383). BP Cherry Point tracks MOC submissions, reviews, and approvals using an enterprise-level MOC tracking system. This electronic tracking system evaluates every MOC-related request as an Addition/Modification Request (AMR). The inspection team examined sample AMRs for Unit #10–Crude/Vacuum, Unit #11–#1 Reformer/Naphtha HDS, and Unit #15–Hydrocracker. The inspection team also interviewed the facility's AMR system coordinator, the PSM program coordinator, and an operations-related PSM representative. The inspection team also reviewed the MOC-related Safety and Health Document #345 (S&H 345), *System Bypass Notification* (BPCP-RMP-017902–017911).

BP Cherry Point administers their pre-startup safety review (PSSR) through the MOC tracking system. This electronic tracking system supports the process engineering staff as they execute PSSR requirements outlined in Process Safety Management (PSM) Document #1070, *Pre-Startup Safety Review Policy* (BPCP-RMP-001609–001636). The inspection team reviewed this document. The inspection team also interviewed key PSSR coordinators and the lead project manager of their most recent comprehensive PSSR for the Unit #27–#3 DHDS. The PSSR teams are composed of operations, engineering, and contractor personnel. The PSSR results are reviewed and approved by the applicable process unit superintendent and, if the PSSR is applicable to a significant process modification/new unit, the BP Cherry Point senior executive level.

- As discussed during the inspection closing meeting, there was some question as to whether AMR 1012B for the replacement of the non-functional flow meter FT 101 adequately considered the technical basis for the change and impacts on safety and health. BP Cherry Point subsequently provided additional information to confirm other instruments that were identified to adequately control the Unit #10–Crude/Vacuum process.
  — AMR 1012B indicated this flow meter "provided data necessary to maintain safe and stable operations," but the crude vacuum tower continued to operate for over 30 days before BP replaced the flow meter. BP did not initiate or complete a System Bypass Form for the bypass of the flow meter.

— After the inspection, BP Cherry Point provided excerpts of unit operations documents that had identified downstream instruments FI-561 and FC-1686 as adequate to determine the vacuum bottoms flow rate (BPCP-RMP-018447–018448).

## Areas of Concern

1. Process Safety Information, **40 CFR 68.65(d)(1)(ii)**: BP Cherry Point's PSI did not contain accurate P&IDs identifying the pressure gauge in the Vacuum Distillation Section Process.

2. Process Safety Information, **40 CFR 68.65(d)(1)(vii)**: BP Cherry Point's PSI did not have material and energy balances for the Unit #26–ULSD (#2 DHDS), Unit #27–#3 DHDS, and Unit #45–Isomer because their material balances did not include the energy balances.

3. Operating Procedures, **40 CFR 68.69(a)(1)(iv)**: BP Cherry Point's emergency shutdown procedures for the #1 Reformer and Naphtha HDS did not include the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.

4. Mechanical Integrity, **40 CFR 68.73(b)**: BP Cherry Point did not establish and implement written procedures to maintain the on-going integrity of controls, including monitoring devices and sensors, which was previously identified in a compliance audit finding.

## List of Attachments

1. Risk Management Program Level 3 Process Checklist

Dave Clark, ERG — 8/1/2014 Date

Dan Roper, ERG — 8/1/2014 Date